

Claims

1. Implantable medical device for stimulating a human or animal heart, comprising a first processor, a first memory unit, a stimulation unit configured to stimulate a first cardiac region of a human or animal heart (7), and a detection unit configured to detect an electric signal at the first cardiac region of the same heart (7), wherein the detection unit comprises i) an electrode lead (4) having an electrode pole (5) and ii) a first channel for measuring electric signals provided by the electrode lead (4),

10 **characterized**

in that a maximum sensitivity of the first channel of the detection unit is adjustable in dependence on a stimulation site of the electrode pole (5), wherein the maximum sensitivity of the first channel lies in a range of from 0.1 mV to 0.4 mV if the electrode pole (5) is intended to detect electric signals at a first stimulation site, wherein the first stimulation site is the His bundle (6) of the heart (7).

15 2. Implantable medical device according to claim 1, **characterized** in that a sensitivity range of the first channel of the detection unit lies in a range of from the maximum sensitivity of the first channel to a minimum sensitivity of the first channel, wherein the minimum sensitivity of the first channel lies in a range of from 5.0 mV to 10.0 mV.

20 3. Implantable medical device according to claim 1 or 2, **characterized** in that a sensitivity of the first channel of the detection unit is adjustable in steps of from 0.05 mV to 0.75 mV.

25 4. Implantable medical device according to any of the preceding claims, **characterized** in that a sensitivity of the first channel of the detection unit is adjustable in first steps in a range of from the maximum sensitivity of the first channel to a first intermediate sensitivity and in second steps in a range of from the first intermediate sensitivity to a minimum sensitivity of the first channel, wherein the first intermediate sensitivity lies in a range of from 0.5 mV to 3.0 mV and the minimum sensitivity of the first channel

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lies in a range of from 5.0 mV to 10.0 mV, wherein the first steps are smaller than the second steps and lie in a range of from 0.05 mV to 0.4 mV.

5. Implantable medical device according to claim 4, **characterized** in that the second steps lie in a range of from 0.4 mV to 0.75 mV.
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6. Implantable medical device according to any of the preceding claims, **characterized** in that the maximum sensitivity of the first channel lies in a range of from 0.5 mV to 4.0 mV if the electrode pole is intended to detect electric signals at a second stimulation site, wherein the second stimulation site is chosen from a right ventricle and a left ventricle of the heart.
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7. Implantable medical device according to any of the preceding claims, **characterized** in that the detection unit comprises a second electrode lead and a second channel for measuring an electric signal at an atrium of the heart with the second electrode lead, wherein a sensitivity range of the second channel of the detection unit lies in a range of from a maximum sensitivity of the second channel to a minimum sensitivity of the second channel, wherein the maximum sensitivity of the second channel lies in a range of from 0.1 mV to 1.0 mV, wherein the minimum sensitivity of the second channel lies in a range of from 1.5 mV to 5.0 mV.
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8. Implantable medical device according to any of the preceding claims, **characterized** in that the detection unit comprises a third electrode lead and a third channel for measuring an electric signal at a right ventricle or a left ventricle of the heart with the third electrode lead, wherein a sensitivity range of the third channel of the detection unit lies in a range of from a maximum sensitivity of the third channel to a minimum sensitivity of the third channel, wherein the maximum sensitivity of the third channel lies in a range of from 0.5 mV to 4.0 mV, wherein the minimum sensitivity of the third channel lies in a range of from 5.0 mV to 10.0 mV.
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9. Implantable medical device according to any of the preceding claims, **characterized** in that the first memory unit comprises a first computer-readable program that causes

the first processor to perform the following steps when executed on the first processor:
a) retrieving or receiving a dataset indicating whether the electrode pole (5) is intended to detect electric signals at the first stimulation site or the second stimulation site; b) adjusting the maximum sensitivity of the first channel to a value lying in a range of
5 from 0.1 mV to 0.4 mV if the electrode pole is intended to detect electric signals at the first stimulation site, or adjusting the maximum sensitivity of the first channel to a value lying in a range of from 0.5 mV to 4.0 mV if the electrode pole is intended to detect electric signals at the second stimulation site.

- 10 10. Arrangement comprising an implantable medical device (1) according to any of the preceding claims and a programming device (2) for programming the implantable medical device (1).
11. Arrangement according to claim 10, **characterized** in that the programming device
15 (2) comprises a second processor and a second memory unit, wherein the second memory unit comprises a second computer-readable program that causes the second processor to perform the following steps when executed on the second processor:
allowing to adjust a maximum sensitivity of a first channel of a detection unit of the implantable medical device (1) to a value lying within a range of from 0.1 mV to 0.4
20 mV if an electrode pole (5) of an electrode of the detection unit is intended to detect electric signals at a first stimulation site, wherein the first stimulation site is the His bundle (6) of the heart.
12. Arrangement according to claim 10 or 11, **characterized** in that the programming
25 device (2) comprises a second processor and a second memory unit, wherein the second memory unit comprises a second computer-readable program that causes the second processor to perform the following steps when executed on the second processor: a) allowing to select one of at least two electrode lead configurations of the implantable medical device (1), wherein the at least two electrode lead configurations
30 comprise a first electrode lead configuration in which a detection unit of the implantable medical device comprises a His bundle electrode lead (4), wherein a first channel of the detection unit serves for measuring electric signals provided by the His

- bundle electrode lead (4), and a second electrode lead configuration in which the detection unit of the implantable medical device does not comprise a His bundle electrode lead, wherein the first channel of the detection unit serves for measuring electric signals provided by an electrode lead that is not a His bundle electrode lead;
- 5 b) if the first electrode lead configuration is selected, setting a maximum sensitivity of the first channel to a value lying within a range of from 0.1 mV to 0.4 mV; if the second electrode lead configuration is selected, setting the maximum sensitivity of the first channel to a value lying within in a range of from 0.5 mV to 4.0 mV.
- 10 13. Arrangement according to any of claims 10 to 12, **characterized** in that the programming device (2) comprises a second processor and a second memory unit, wherein the second memory unit comprises a second computer-readable program that causes the second processor to perform the following steps when executed on the
- 15 of the implantable medical device (1), wherein the at least two electrode lead configurations comprise a first electrode lead configuration in which a detection unit of the implantable medical device (1) comprises a His bundle electrode lead (4), wherein a first channel of the detection unit serves for measuring electric signals provided by the His bundle electrode lead (4), and a second electrode lead
- 20 configuration in which the detection unit of the implantable medical device (1) does not comprise a His bundle electrode lead, wherein the first channel of the detection unit serves for measuring electric signals provided by an electrode lead that is not a His bundle electrode lead; b) transmitting a dataset to the implantable medical device (1), the dataset indicating whether the first electrode lead configuration or the second
- 25 electrode lead configuration is selected.
14. Method for programming an implantable medical device according to any of claims 1 to 9 with a programming device (2), wherein the implantable medical device (1) comprises a first data communication unit, wherein the programming device (2)
- 30 comprises a second data communication unit, the method comprising the following steps:

- 5 a) selecting, with the programming device (2), one of at least two electrode lead configurations of the implantable medical device (1), wherein the at least two electrode lead configurations comprise a first electrode lead configuration in which a detection unit of the implantable medical device comprises a His bundle electrode lead (4), wherein a first channel of the detection unit serves for measuring electric signals provided by the His bundle electrode lead (4), and a second electrode lead configuration in which the detection unit of the implantable medical device does not comprise a His bundle electrode lead, wherein the first channel of the detection unit serves for measuring electric signals provided by the electrode lead that is not a His bundle electrode lead;
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- b) generating, with the programming device (2), a dataset comprising i) instructions for setting a maximum sensitivity of the first channel to a value lying within a range of from 0.1 mV to 0.4 mV, if the first electrode lead configuration has been selected; or ii) instructions for setting the maximum sensitivity of the first channel to a value lying within in a range of from 0.5 mV to 4.0 mV if the second electrode lead configuration has been selected;
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- c) transmitting, with the second data communication unit, the dataset to the implantable medical device (1);
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- d) receiving, with the first data communication unit, the dataset;
- e) setting the maximum sensitivity of the first channel of the detection unit by using the received dataset.
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